

CLAIMS

What is claimed is:

1. An isolated polynucleotide comprising a first nucleotide sequence encoding a polypeptide of at least 348 amino acids that has at least 80% identity based on the Clustal method of alignment when compared to a polypeptide selected from the group consisting of SEQ ID NOs:2, 4, 6, 8 and 10 or a second nucleotide sequence comprising the complement of the first nucleotide sequence.

5 2. The isolated polynucleotide of Claim 1, wherein the first nucleotide sequence consists of a nucleic acid sequence selected from the group consisting of SEQ ID NOs:1, 3, 10 5, 7 and 9 that codes for the polypeptide selected from the group consisting of SEQ ID NOs:2, 4, 6, 8 and 10.

10 3. The isolated polynucleotide of Claim 1 wherein the nucleotide sequences are DNA.

15 4. The isolated polynucleotide of Claim 1 wherein the nucleotide sequences are RNA.

5 5. A chimeric gene comprising the isolated polynucleotide of Claim 1 operably linked to suitable regulatory sequences.

6. A host cell comprising the chimeric gene of Claim 5.

7. A host cell comprising an isolated polynucleotide of Claim 1.

20 8. The host cell of Claim 7 wherein the host cell is selected from the group consisting of yeast, bacteria, plant, and virus.

9. A virus comprising the isolated polynucleotide of Claim 1.

10 10. A polypeptide of at least 348 amino acids that has at least 80% identity based on the Clustal method of alignment when compared to a polypeptide selected from the group consisting of SEQ ID NOs:2, 4, 6, 8 and 10.

25 11. A method of selecting an isolated polynucleotide that affects the level of expression of a flavonoid biosynthetic enzyme polypeptide in a plant cell, the method comprising the steps of:

30 (a) constructing an isolated polynucleotide comprising a nucleotide sequence of at least one of 30 contiguous nucleotides derived from an isolated polynucleotide of Claim 1;

(b) introducing the isolated polynucleotide into a plant cell;

(c) measuring the level of a polypeptide in the plant cell containing the polynucleotide; and

35 (d) comparing the level of polypeptide in the plant cell containing the isolated polynucleotide with the level of polypeptide in a plant cell that does not contain the isolated polynucleotide.

12. The method of Claim 11 wherein the isolated polynucleotide consists of a nucleotide sequence selected from the group consisting of SEQ ID NOs:1, 3, 5, 7 and 9 that codes for the polypeptide selected from the group consisting of SEQ ID NOs:2, 4, 6, 8 and 10.

5 13. A method of selecting an isolated polynucleotide that affects the level of expression of a flavonoid biosynthetic enzyme polypeptide in a plant cell, the method comprising the steps of:

- (a) constructing an isolated polynucleotide of Claim 1;
- (b) introducing the isolated polynucleotide into a plant cell; and

10 14. A method of obtaining a nucleic acid fragment encoding a flavonoid biosynthetic enzyme polypeptide comprising the steps of:

15 (a) synthesizing an oligonucleotide primer comprising a nucleotide sequence of at least one of 30 contiguous nucleotides derived from a nucleotide sequence selected from the group consisting of SEQ ID NOs:1, 3, 5, 7, 9 and the complement of such nucleotide sequences; and

- (b) amplifying a nucleic acid sequence using the oligonucleotide primer.

20 15. A method of obtaining a nucleic acid fragment encoding a flavonoid biosynthetic enzyme polypeptide comprising the steps of:

(a) probing a cDNA or genomic library with an isolated polynucleotide comprising at least one of 30 contiguous nucleotides derived from a nucleotide sequence selected from the group consisting of SEQ ID NOs:1, 3, 5, 7, 9 and the complement of such nucleotide sequences;

25 (b) identifying a DNA clone that hybridizes with the isolated polynucleotide;

- (c) isolating the identified DNA clone; and

(d) sequencing the cDNA or genomic fragment that comprises the isolated DNA clone.

16. A composition comprising the isolated polynucleotide of Claim 1.

30 17. A composition comprising the isolated polypeptide of Claim 10.

18. An isolated polynucleotide comprising the nucleotide sequence having at least one of 30 contiguous nucleotides derived from a nucleic acid sequence selected from the group consisting of SEQ ID NOs:1, 3, 5, 7, 9 and the complement of such sequences.

35 19. An expression cassette comprising an isolated polynucleotide of Claim 1 operably linked to a promoter.

20. A method for positive selection of a transformed cell comprising:

- (a) transforming a host cell with the chimeric gene of Claim 5 or an expression cassette of Claim 19; and

(b) growing the transformed host cell under conditions which allow expression of the polynucleotide in an amount sufficient to alter isoflavone levels in the cell to provide a positive selection means.

21. The method of Claim 20 wherein the host cell is a plant cell.
- 5 22. The method of any of Claims 11 or 13 wherein the plant cell is a monocot.
23. The method of any of Claims 11 or 13 wherein the plant cell is a dicot.